

claims, as pending in the subject application, read as follows:

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1 (Amended) A method of controlling a print operation of an ink jet printer, comprising the steps of:
determining whether a print head temperature has cooled to a threshold temperature after a printing operation;
and
controlling a capping sequence to cap the print head after the print head temperature has cooled to the threshold temperature.

2. (Not Changed From Prior Version) A method according to Claim 1, wherein the determining step is repeated.

3. (Not Changed From Prior Version) A method according to Claim 1, wherein the determining step is performed once before the controlling step.

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4. (Amended) A method of controlling a print operation of an ink jet printer, comprising the steps of:
cooling a print head by causing ink droplets to be ejected from the print head; and

capping the print head after the print head is cooled.

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6. (Amended) A method according to Claim 4, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

7. (Not Changed From Prior Version) A method of controlling a print operation of an ink jet printer, comprising the steps of:
printing an image using a print head; and
cooling the print head by causing ink droplets to be ejected from the print head after the end of the printing operation.

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9. (Amended) A method according to Claim 7, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

10. (Not Changed From Prior Version) A method of controlling a print operation of an ink jet printer, comprising the steps of:
obtaining a parameter corresponding to a print head temperature when the ink jet printer is down in order to

determine whether a print head cooling operation has been interrupted; and

performing a predetermined process based on the parameter.

11. (Not Changed From Prior Version) A method according to Claim 10, wherein the parameter is obtained by a calculation, without using a measured actual temperature.

12. (Not Changed From Prior Version) A method according to Claim 10, wherein the parameter is obtained directly from a measured actual temperature.

13. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process occurs in a next print job performed by the ink jet printer.

14. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process occurs at a next power-on for the ink jet printer.

15. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process occurs at an end of a current print job.

16. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process is determined based on whether a print head is capped or not.

17. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process comprises changing a number of ink droplets ejected before a print job.

18. (Not Changed From Prior Version) A method according to Claim 10, wherein the predetermined process comprises purging ink from the print head.

19. (Not Changed From Prior Version) A method of cooling a print head of an ink jet printer before capping, comprising the steps of:

determining an ambient temperature;

determining a print head temperature after receipt of last print data for a print job;

waiting a predetermined time after receipt of the last print data for the print job;

after waiting the predetermined time, ejecting a predetermined number of ink droplets from nozzles of the

print head at a frequency lower than a frequency used for printing;

determining a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

repeating the steps of waiting a predetermined time and ejecting a predetermined number of ink droplets until the print head temperature falls below a threshold.

20. (Not Changed From Prior Version) A method according to Claim 19, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

21. (Not Changed From Prior Version) A method according to Claim 19, wherein the print head temperature after receipt of the last print data for the print job is determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

22. (Not Changed From Prior Version) A method according to Claim 19, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

23. (Not Changed From Prior Version) A method according to Claim 19, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

24. (Not Changed From Prior Version) A method according to Claim 19, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

25. (Not Changed From Prior Version) A method according to Claim 19, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five kilohertz.

26. (Not Changed From Prior Version) A method according to Claim 19, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a calculation based on the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

27. (Not Changed From Prior Version) A method according to Claim 19, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

28. (Not Changed From Prior Version) A method according to Claim 19, further comprising the step of purging ink from the print head in a case that the method of Claim 19 is interrupted before the print head temperature has fallen below the threshold.

29. (Not Changed From Prior Version) A method of cooling a print head of an ink jet printer, comprising the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

30. (Amended) An apparatus for controlling a print operation of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein the executable process steps include the steps of: (a) determining whether a print head temperature has cooled to a threshold temperature after a printing operation; and (b) controlling a capping sequence to cap the print head after the print head temperature has cooled to the threshold temperature.

31. (Not Changed From Prior Version) An apparatus according to Claim 30, wherein the determining step is repeated.

32. (Not Changed From Prior Version) An apparatus according to Claim 30, wherein the determining step is performed once before the controlling step.

33. (Amended) An apparatus for controlling a print operation of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein the executable process steps include the steps of: (a) cooling a print head by causing ink droplets to be ejected from the print head; and (b) capping the print head after the print head is cooled.

35. (Amended) An apparatus according to Claim 33, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

36. (Not Changed From Prior Version) An apparatus for controlling a print operation of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein, the executable process steps include steps of: (a) printing an image using the print head; and (b) cooling the print head by causing ink droplets to be ejected from the print head after the end of the printing operation.

38. (Amended) An apparatus according to Claim 36, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

39. (Not Changed From Prior Version) An apparatus for controlling a print operation of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein the executable process steps include steps of: (a) obtaining a parameter corresponding to a print head temperature when the ink jet printer is down in order to determine whether a print head cooling operation has been

interrupted; and (b) performing a predetermined process based on the parameter.

40. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the parameter is obtained by a calculation, without using a measured actual temperature.

41. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the parameter is obtained directly from a measured actual temperature.

42. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process occurs in a next print job performed by the ink jet printer.

43. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process occurs at a next power-on for the ink jet printer.

44. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process occurs at an end of a current print job.

45. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process is determined based on whether the print head is capped or not.

46. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process comprises changing a number of ink droplets ejected before a print job.

47. (Not Changed From Prior Version) An apparatus according to Claim 39, wherein the predetermined process comprises purging ink from the print head.

48. (Not Changed From Prior Version) An apparatus for controlling cooling of a print head of an ink jet printer before capping, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein the executable process steps include steps of: (a) determining an ambient temperature; (b) determining a print head temperature after receipt of a last print data for a print job; (c) waiting a predetermined time after receipt of the last print data for the print job; (d) after waiting the predetermined time, ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing; (e) determining a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and (f) repeating the steps of waiting a predetermined time and ejecting a predetermined number of ink droplets until the print head temperature falls below a threshold.

49. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

50. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the print head temperature after receipt of the last print data for the print job is determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

51. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

52. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

53. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

54. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five thousand hertz.

55. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a calculation based on

the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

56. (Not Changed From Prior Version) An apparatus according to Claim 48, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

57. (Not Changed From Prior Version) An apparatus according to Claim 48, further comprising the step of purging ink from the print head in a case that the process steps of Claim 48 are interrupted before the print head temperature has fallen below the threshold.

58. (Not Changed From Prior Version) An apparatus for controlling cooling a print head of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head;

wherein the executable process steps include the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

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59. (Amended) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

code to determine whether a print head temperature has cooled to a threshold temperature after a printing operation; and

code to control a capping sequence to cap the print head after the print head temperature has cooled to the threshold temperature.

60. (Not Changed From Prior Version) Computer-executable process steps according to Claim 59, wherein the code to determine a print head temperature is executed repeatedly.

61. (Not Changed From Prior Version) Computer-executable process steps according to Claim 59, wherein code to determine a print head temperature is executed once before the code to control the capping sequence.

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62. (Amended) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

code to cool a print head by causing ink droplets to be ejected from the print head; and

code to cap the print head after the print head is cooled.

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64. (Amended) Computer-executable process steps according to Claim 62, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

65. (Not Changed From Prior Version) Computer-executable process steps stored on a computer-readable medium, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

code to print an image using a print head; and

code to cool the print head by causing ink droplets to be ejected from the print head after the end of the printing operation.

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67. (Amended) Computer-executable process steps according to Claim 65, wherein the ink droplets are ejected at a frequency lower than a frequency used for printing.

68. (Not Changed From Prior Version) Computer-executable process steps stored on a computer-readable medium, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

code to obtain a parameter corresponding to a print head temperature when the ink jet printer is down in order to determine whether a print head cooling operation has been interrupted; and

code to perform a predetermined process based on the parameter.

69. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the parameter is obtained by a calculation, without using a measured actual temperature.

70. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the parameter is obtained directly from a measured actual temperature.

71. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process occurs in a next print job performed by the ink jet printer.

72. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process occurs at a next power-on for the ink jet printer.

73. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process occurs at an end of a current print job.

74. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process is determined based on whether a print head is capped or not.

75. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process comprises changing a number of ink droplets ejected before a print job.

76. (Not Changed From Prior Version) Computer-executable process steps according to Claim 68, wherein the predetermined process comprises purging ink from the print head.

77. (Not Changed From Prior Version) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control cooling of a print head of an ink jet printer before capping, the computer-executable process steps comprising:

code to determine an ambient temperature;

code to determine a print head temperature after receipt of a last print data for a print job;

code to wait a predetermined time after receipt of the last print data for the print job;

code to eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing;

code to determine a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

code to repeat execution of the code to wait a predetermined time and the code to eject a predetermined number of ink droplets until the print head temperature falls below a threshold.

78. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

79. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the print head temperature after receipt of the last print data for the print job is determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

80. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

81. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

82. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

83. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five thousand hertz.

84. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a calculation based on the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

85. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

86. (Not Changed From Prior Version) Computer-executable process steps according to Claim 77, further comprising code to purge ink from the print head in a case that the execution of the computer-executable process steps of Claim 77 are interrupted before the print head temperature has fallen below the threshold.

87. (Not Changed From Prior Version) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control cooling of a print head of an ink jet printer, the computer-executable process steps comprising code to repeatedly eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

88. (Amended) A computer-readable medium which stores computer-executable process steps, the computer-

executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

a determining step to determine whether a print head temperature has cooled to a threshold temperature after a printing operation; and

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a controlling step to control a capping sequence to cap the print head after the print head temperature has cooled to the threshold temperature.

89. (Amended) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

a cooling step to cool a print head by causing ink droplets to be ejected from the print head; and

a capping step to cap the print head after the print head is cooled.

~~90. (Not Changed From Prior Version) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:~~

a printing step to print an image using a print head; and

a cooling step to cool the print head by causing ink droplets to be ejected from the print head after the end of the printing operation.

91. (Not Changed From Prior Version) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

an obtaining step to obtain a parameter corresponding to a print head temperature when the ink jet printer is down in order to determine whether a print head cooling operation has been interrupted; and

a performing step to perform a predetermined process based on the parameter.

92. (Not Changed From Prior Version) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control cooling of a print head of an ink jet printer before capping, the computer-executable process steps comprising:

a first determining step to determine an ambient temperature;

a second determining step to determine a print head temperature after receipt of a last print data for a print job;

a waiting step to wait a predetermined time after receipt of the last print data for the print job;

an ejecting step to eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing;

a third determining step to determine a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

a repeating step to repeat the waiting step to wait a predetermined time and the ejecting step to eject a predetermined number of ink droplets.

93. (Not Changed From Prior Version) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control cooling of a print head of an ink jet printer, the computer-executable process steps comprising the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.